REWARD MAGNITUDE AND LIKING FOR INSTRUMENTAL ACTIVITY

BY

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by

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Date: May 18, 1962

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A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Psychology in the Graduate School of Arts and Sciences of Duke University

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ABSTRACT

(Psychology-Social)

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ABSTRACT

It is commonly assumed that the more an object facilitates attainment of important goals, the more it is liked. Dissonance theory yields an opposite prediction. A two process conception of the relation between reward and attitude which reconciles these views is presented. A V-curve relation between reward magnitude and liking for activity instrumental to reward attainment is hypothesized. At the point where the relative number of dissonant cognitions is psychologically insignificant or zero, a direct satisfaction process supplants the dissonance process. The slope of the reward-attitude curve shifts from negative to positive at this transition point.

In an experiment designed to test this hypothesis students were offered 2, 4, or 8 experimental credit points for committing themselves to three hours of work at a highly repetitious task. Experimental credit points contribute to students' final course grades and are therefore highly valued by subjects. The instructions were varied such that both the task and the subject's part in the experiment were placed in either a neutral or a negative light (Neutral or Negative Instructions conditions). Regardless of the Instructions used, 8 Credit groups expressed greater liking for the activity and more pleasure with participating than 4 Credit groups. Contrary to

expectation, Affect scores for 2 Credit Neutral subjects were similar to those of 4 Credit Neutral subjects and significantly lower than those of 8 Credit Neutral subjects. Several possible explanations of the lack of difference between 2 and 4 Credit Neutral groups are discussed. It is suggested that the reward-attitude function is U-shaped rather than V-shaped and that these two groups both lie in a relatively flat region of the curve in which dissonance and direct satisfaction effects operate simultaneously to increase attitudinal positivity. Though Negative Instructions (administered to one 4 Credit and one 8 Credit group) were expected to produce an inverse relation between reward and liking, they simply resulted in a uniform drop in Affect Scale scores. The Instructions variable had no impact on Desired Frequency of Rest Period, a less direct index of attitude. For the reward manipulation an opposite trend occurred. Varying the number of credit points had a relatively stronger effect on Desired Frequency of Rest scores and a relatively weaker (though still significant) effect on the Affect Scales. This result suggests that the Instructions variable actually failed to alter activity attractiveness. The effects of Negative Instructions on Affect Scale ratings could have been produced either by subjects' tendency to conform to the experimenter's apparent expectations or by the decrease of inter-personal situational restraints against public expression of dislike for the experiment in the experimenter's presence.

Neither acceptance nor rejection of the general two-process hypothesis of attitude formation is warranted by these data. Nevertheless, the experiment clearly demonstrates that reward magnitude and attitudes toward

activities instrumental in securing the reward are positively related under certain conditions, a finding which suggests an important restriction on the generality of Festinger's dissonance theory.

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G.S.L.

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REWARD MAGNITUDE AND LIKING FOR INSTRUMENTAL ACTIVITY

CHAPTER I

INTRODUCTION TO THE PROBLEM

Two Views of Attitude Formation

A "traditional" view of attitude formation and some contradictory evidence. It is commonly assumed that entities which lead to positively valued consequences are liked while those which lead to negative consequences are disliked. These entities may be one's own activities, events, other persons, etc. Positive affect is expressed toward cognitive objects instrumental to goal attainment and negative affect toward those which interfere with goal attainment. The greater the facilitation or interference, the more intense these attitudes become. Increasing the importance of the goals involved should also result in more intense attitudinal affect. These assumptions are widely held (e.g., Carlson, 1956; DiVesta and Merwin, 1960; Katz, 1960; Katz and Stotland, 1959; Peak, 1955, 1960; Rosenberg, 1956, 1960a, 1960b; Woodruff and DiVesta, 1948).

The generality of this rather traditional view of attitude formation is questioned by studies stemming from Festinger's (1957) theory of cognitive

dissonance. These investigations suggest that under certain conditions, increasing the amount of unrewarding and ordinarily unpleasant behavior (as pre-determined by independent measures) a person is committed to perform increases his liking for the activity and aspects of the situation to which he has committed himself. For example, Brehm (1960) had eighth grade students participate in a study of consumer food preferences. They were asked to rate their liking for a vegetable which they strongly disliked (as determined by pre-experimental ratings for 34 vegetables). Subjects were then offered a reward if they would eat some of the disliked food. It was emphasized that they need not eat the vegetable if they did not want to though, in this case, they would not receive a gift certificate exchangeable for records or movie tickets. Half were told they would have to eat one small dish of the vegetable immediately (Low Eating condition) while the other half were asked to eat one small dish immediately and three or four more dishfulls in the weeks to come (High Eating condition). Subjects proceeded to eat a dish of the vegetable and were then given some "research reports" to look over. When exposed to dissonance producing information which denigrated the food's nutritional value, High Eating subjects showed greater liking for the food than Low Eating subjects. Their ratings were also more positive than those of other High Eating subjects who received supporting rather than denigrating information. Thus the larger the commitment to engage in disliked activity, the more positive attitudes toward the vegetable -- and, presumably, the act of eating it -- became, a result opposite the expectations of the traditional view.

The traditional approach would also assume that increasing the

punishment or deprivation associated with engaging in an activity would produce increasingly more negative affective reactions to the activity. A study by Brehm and Cohen (1959) demonstrates this is not always the case. These investigators confronted students with the prospect of participating in a project requiring three solid hours of random number copying. After filling out a schedule of possible appointment times, subjects discovered they would not be paid but that most other persons taking part would be. They thought they were being deprived (relative to other student participants) of either one or ten dollars. Subjects then rated their satisfaction with having been assigned to the project. A response measure reflecting the degree of choice they felt about whether or not they could back out of the experiment if they wanted to was also taken. Subjects were split into High and Low Perceived Choice groups. For High Perceived Choice individuals, greater satisfaction was manifested in the high relative deprivation (ten dollar) condition. Thus, the assumption that increasing relative deprivation pursuant to a behavioral commitment invariably results in more negative affective reactions is refuted. A commitment with more negative consequences can result in greater satisfaction.

Subjects in the Brehm (1960) and Brehm and Cohen (1959) studies were maneuvered into positions of feeling they had voluntarily committed themselves to engage in activities they would ordinarily prefer to avoid. In both investigations, a rather complex constellation of forces produces the behavioral commitment. In this constellation, the experimentally manipulated forces probably play a relatively minor role. Thus, in Brehm's study it

seems unlikely that the reward offer or the variations in negativity of the behavioral commitment are major factors in producing the commitment. Similarly, the relative deprivation manipulation in the Brehm and Cohen experiment was an unanticipated chance event which followed subjects' commitment to the anticipated three hour work period. Thus, amount of deprivation had no part in producing commitment. In both studies participation in the experimental procedures was produced primarily by subjects' adherence to normative prescriptions, i.e., by their cooperation with legitimate authorities. In short, it may be questionable to regard these commitments as clear examples of avowedly instrumental behavior. Nevertheless, it is possible to view these commitments according to a paradigm of instrumental behavior. When so interpreted, they clearly disconfirm the generality of the traditional view of direct relationships between the instrumental consequences of actions and situations and attitudes toward them. These findings are not accidental. They stem from predictions derived from cognitive dissonance theory.

Festinger's Theory of Cognitive Dissonance

The arousal of dissonance. Cognitive dissonance is an unpleasant psychological tension state which arises when related items of information (cognitions or cognitive elements) are inconsistent, or, in Festinger's terms, when one cognition follows from the obverse of another (Festinger, 1957). These informational elements are knowledge of one's own behavior, feelings, and beliefs, knowledge about one's environment, and so on. Whenever a

person engages or is committed to engage in a behavior, the relations between the cluster of cognitive elements representing that behavior and every other cluster of cognitive elements in his cognition can be specified as either dissonant, consonant, or irrelevant. Thus, dislike for an activity and/or the negative consequences of a behavior are dissonant with being committed to engage in it. On the other hand, liking for an activity and/or desirable consequences following from it are consonant with being committed to its performance. Considering all elements relevant to a behavioral commitment, the magnitude of dissonance increases as the proportion of dissonant cognitions rises. Thus, increasing rewards and other positive consequences of a behavior or the attractiveness of the behavior itself will decrease the magnitude of dissonance resulting from a behavioral commitment. Decreasing rewards or increasing the negativity of other consequences of the behavior or the negativity of the behavior itself serves to increase the magnitude of dissonance.

The magnitude of dissonance is a function of the importance as well as the relative numbers of cognitions involved. In determining the magnitude of dissonance each cognitive element in the ratio of dissonant to consonant cognitions is weighted according to its importance. For the sake of clarity of discussion we shall make the simplifying assumption throughout that all cognitions are equally important.

The reduction of dissonance. As with many other tension states, it is assumed that the individual seeks to reduce or eliminate dissonance. Dissonance can be reduced by the person's somehow terminating or decreasing

the inconsistency between the discrepant clusters of cognitive elements. This may be accomplished by directly changing some of the cognitions involved in the discrepant relation or by adding cognitions in a selective fashion such that the relative degree of inconsistency is decreased. Thus dissonance can be reduced by such means as behavioral change, change in attitude toward the behavior (seeing the behavior as more likeable, for example), re-evaluation of the consequences of the behavior (the consequences may be seen as more satisfactory), or the addition of new elements which justify the behavior or which facilitate behavioral change. Often, dissonance is reduced by changes in behavior, i.e., the individual refuses to do what he does not like doing. On other occasions, however, it may not be desirable or possible to change the behavior. Thus when the individual is committed to a course of action, as in the Brehm (1960) and Brehm and Cohen (1959) studies, other avenues of dissonance reduction such as re-evaluation of the activity or its consequences will be utilized.

The role of incentives in dissonance theory and in the "traditional" view.

Dissonance theory asserts that enduring modifications in attitudinal affect often occur during the process of dissonance reduction. The theory makes no assumptions about *direct* relationships between consonant (e.g., rewards) or dissonant (e.g., punishments) cognitions as factors responsible for enduring modifications in attitudinal affect. Factors such as reward, punishment, effort, etc., are considered only in terms of their dissonance or consonance with current behavior and their role in determining the magnitude of dissonance. They are not discussed as forces which directly influence the

affective components of attitude structures.

This restricted view accounts, in part, for the non-obvious nature of dissonance theory predictions. The traditional view of attitude formation considers only the direct influence of such factors in making predictions. It assumes that if an entity has negative consequences for the individual the affective component of the attitude structure built around that entity is negative. The more positive an entity's consequences, the more positive the affective component becomes. The experiments discussed demonstrate the oversimplified nature of this view and the correctness of certain contrary dissonance theory derivations. A conception which considers only the direct effects of affect-inducing stimuli and ignores the possibility of intervening dissonance processes would not predict the findings described above.

Findings Supporting the "Traditional" View

We have seen that dissonance theory predicts a negative correlation between pre-commitment instrumental activity attractiveness and amount of positive change in pre- to post-commitment instrumental activity attractiveness; a positive correlation between negative consequences following from a behavioral commitment and amount of increase in liking for that activity; a negative correlation between reward attainment or other positive consequences of an instrumental activity and amount of increase in liking for that activity. Though these hypotheses receive empirical support, there is clear evidence that their generality must be restricted. For example, half

of Brehm's (1960) subjects were exposed to a supporting communication which emphasized the vegetable's high nutritional value following commitment to eat a disliked food. Contrary to results for groups exposed to denigrating information, subjects who ate small amounts and then received supporting information manifested greater liking for the vegetable than those committed to eating large amounts who also received supporting information. Thus, the smaller the amount of unattractive behavior these subjects were to engage in, the more their liking for the object of the behavior increased. This finding contradicts the dissonance theory hypothesis that pre-commitment instrumental activity attractiveness and amount of post-commitment increase in activity attractiveness are negatively correlated.

Other data supporting the view that attitudes are a direct function of the type of affect induced by the object of the attitude are found in Brehm and Cohen's (1959) Low Perceived Choice groups. For these individuals satisfaction decreased as relative deprivation increased, a trend opposite that obtained in High Perceived Choice groups. This result is consistent with usual views of the effects of magnitude of relative deprivation and suggests important restrictions on the hypothesis that liking for an activity increases as the negativity of its consequences rises. On the basis of these and other data, Brehm and Cohen (in press) assert that voluntary commitment is a necessary condition for the arousal of dissonance following a behavioral commitment.

The hypothesis that liking for an instrumental activity decreases as its consequences become more positive must also be qualified. Leventhal

and Brehm (in press) varied the number of experimental credit points offered to student volunteers for committing themselves to five hours of work at dull, repetitious tasks. Subjects were offered a moderately fair number of credit points (6) or a generous amount (12) and allowed to sample the two tasks (nonsense syllable memorizing and a recognition test of recall) before agreeing to participate. Although the experiment was primarily designed as a study of factors affecting post-choice attitude change (subjects were presented with a choice of working on one task or the other for the full five hour period) subjects may be compared on their post-commitment (to participate) pre-choice (between tasks) ratings of liking for each task. Low Reward subjects had been expected to show greater liking for the tasks than High Reward subjects but a significant effect in the opposite direction was found. Thus the magnitude of positive consequences (reward) of an instrumental activity was positively correlated with liking for that activity. This finding clearly supports the view that heightening the magnitude of a goal increases the positivity of attitudes toward entities (here, an activity) instrumental in securing that goal.

Additional relevant studies are available but they differ in certain aspects from those stemming from dissonance theory. In the experiments discussed above, subjects were committed to engage in behavior having instrumental consequences and their feelings about the behavior were ascertained. The instrumental entity concerned was one's own behavior. Frequently, however, an instrumental entity is an external object or event, or another person. In such instances the individual lacks a behavioral commitment that

is clearly responsible for the events which have significant motivational consequences for him. The entity which is the object of the attitude is external to himself. Of course, the absence of self-production of the instrumental consequences does not imply lack of self-involvement. Whether the entity is one's own behavior or the effects of someone or something else, it can have implications for one's goals and satisfactions. At this point, there is no reason to assume that processes determining attitudes towards one's own instrumental actions are different from processes determining attitudes toward instrumental entities of any type. Nevertheless, it is possible that the presence or absence of direct behavioral involvement in instrumental events has special psychological implications. Discounting this possibility for the present, let us consider a line of research in which investigators have focused on the determinants of attitudes towards things and events other than one's own behavior which have instrumental consequences. Generally, these studies suggest that entities instrumental to goal attainment are positively evaluated while those hindering goal attainment are negatively evaluated.

Experiments by Woodruff and DiVesta (1948) and Rosenberg (1956) find that more positive attitudes accompany beliefs that the cognitive object of the attitude is instrumental to the satisfaction of important values. Rosenberg's (1956) subjects rated the importance of 35 values as sources of personal satisfaction. The perceived instrumental relation between these values and an attitude object (allowing communists to speak in public) was also ascertained. Higher importance of values and/or higher perceived

instrumentality was associated with more intense positive affect for the attitudinal object. Such data demonstrate cognitive-affective consistency in a static attitude structure but lack cogency as support for the hypothesized positive relationship between value importance or perceived instrumentality and attitudinal affect. R-R relationships reveal nothing about their genesis. In this regard, Rosenberg (1960b) has dramatically demonstrated that supporting informational components of attitude structures may be reorganized _after_ a new affective reaction is independently established (in this case via post-hypnotic suggestion). Other data (Peak and Morrison, 1958; Maccoby, Maccoby, Romney, and Adams, 1961) indicate that a person holding a particular attitude tends to be more sensitive to and seeks out information consistent with his feeling about the issue. In view of these considerations it is clear that Rosenberg's (1956) demonstration of consistency within a static attitude structure and the conceptually similar findings of Woodruff and DiVesta (1948) reveal little about the nature of the processes responsible for this consistency. In several studies, however, perceived instrumentality and the importance of values to which an attitude object is instrumental have been experimentally manipulated. These investigations provide more adequate evidence concerning the relationship between these variables and attitudes.

DiVesta and Merwin (1960) exposed subjects to communications emphasizing the merits of teaching as an occupation. For one group the communication implied that achievement goals would go unfulfilled in the teaching profession while for a second group, stress was on the ample satis-

factions of achievement strivings that teaching offers. Perceived instrumental relations between achievement goals (and three other need areas as well) and teaching were altered accordingly. Corresponding changes in attitude toward teaching occurred with the high instrumentality communication increasing attitudinal positivity and the negative instrumentality communication decreasing attitudinal positivity. In this connection, an earlier experiment by Carlson (1956) should be mentioned. He measured perceived instrumental relationships between segregation of negro housing and 25 values. Experimental subjects were asked to write in support of four statements each of which asserted that elimination of such segregation would facilitate realization of several personally significant values. Sometime afterwards, subjects listened to four prepared discussions which supported each of these statements. In comparison to a control group, subjects exposed to this treatment perceived a stronger instrumental link between eliminating segregation and realizing the values in question. Correspondingly, a greater proportion of experimental subjects developed more positive attitudes toward eliminating segregation of negro housing. Unfortunately, the attitude change procedure employed obscures the cause of these effects. The theoretical position espoused by Carlson (1956) and others suggests that change in perceived instrumentality logically precedes attitude change. However, the psychological processes underlying the effects of writing compositions in support of positions with which one does not fully agree are not sufficiently well understood to assume that this sequence does in fact occur. Concurrent changes in perceived instrumentality and attitude could be produced by a

rather different process, viz., the reduction of dissonance generated by performance of attitude discrepant behavior. A number of studies clearly show that under certain conditions (which are probably present in Carlson's study) the writing of statements which one does not believe produces acceptance of them. (e.g., Cohen, in press; Rabbie, Brehm, and Cohen, 1959). Another difficulty with Carlson's investigation is the pattern of change found in the control group, which suggests that much of the attitude shift in the experimental group is attributable to extra-experimental factors. Nevertheless, when taken together, the DiVesta and Merwin (1960) and Carlson (1956) experiments suggest that the more an event or object is perceived as instrumental to the fulfillment of one's values, the more positively it is evaluated.

Additional support for this assertion is found in Kleiner's (1960) study of the determinants of interpersonal attraction. Three man groups were threatened with failure on group problem solving tasks. A confederate made an outstanding contribution to the group's efforts thereby reducing the probability of group failure. The confederate was seen as more important to the team. Presumably, his actions were instrumentally beneficial to the aims of other group members. The larger the reduction in probability of group failure he produced, the more positively he was evaluated. Similarly, with a higher initial probability of failure, the confederate was evaluated more positively at each level of amount of reduction of probability of group failure. Thus, the higher the initial level of motivation, i.e., the greater the initial fear of failure, the more intense were subjects' positive affective reactions to the instrumental entity, the confederate.

Peak (1960) has also demonstrated that increased importance of the goal being facilitated by an instrumental entity increases the affective positivity of that entity. She had students indicate the extent of their agreement with several academic procedures and policies which affected them directly (e.g., all classes having no more than 20 students, giving unannounced quizzes, etc.). The extent to which each of these policies was perceived to facilitate or interfere with getting good grades was also determined. Responses to attitude and perceived instrumentality measures were taken twice for each student, once, immediately after a 15 minute class quiz, i.e., under conditions of Need Achievement Arousal, and once when no examination was given, i.e., under No Arousal conditions. The frequency of positive attitudes toward instrumentally facilitating policies was higher under Arousal than under No Arousal conditions. The frequency of positive attitudes toward instrumentally interfering policies was lower under Arousal than under No Arousal conditions.

Thus, a number of studies demonstrate that attitudes toward instrumental entities other than one's own behavior become more positive as the degree of instrumentality and/or the importance goals being facilitated increases. Subjects in these experiments are not committed to engage in disliked activity as is the case in the investigations of Brehm (1960) and Brehm and Cohen (1959). With the possible exception of Carlson's (1956) study, these experiments do not involve forced compliance situations in which persons engage in attitude discrepant activity to secure reward or avoid punishment. Yet they are consistent with the findings of Brehm's (1960) Supporting

Information groups, Brehm and Cohen's (1959) Low Choice groups, and the Leventhal and Brehm (in press) experiment, all of which utilized forced compliance situations which required behavioral commitment, and which obtained results not predicted by dissonance theory. This suggests that behavioral commitment *qua* behavioral commitment is not the variable which directly determines the direction of the relationship between the instrumental consequences of entities and attitudes toward them.

Instrumentality and contiguity --- two types of connection with motivational consequences. Evidence thus far reviewed suggests that the correlation between instrumental consequences of an entity and the attitudinal affect it arouses is sometimes positive and sometimes negative. Before asking what variables determine the form of this relationship and of the nature of psychological processes involved, we must consider an issue previously by-passed. The basic question is: what entities present at the time of motivational fulfillment or frustration will undergo change in attractiveness? For which entities will new attitudes be established? In the course of behavior or other events having instrumental consequences, two "classes" of cognitive entities will be present. First, are those entities perceived as directly facilitating or interfering with goal attainment. Second, are those entities which are simply contiguous with the instrumental consequences without being perceived as responsible for them. As an example, consider Kleiner's (1960) study in which a confederate produced a reduction in a group's probability of failure. There is a clear causal relationship between the confederate's activity and a desirable consequence. And, to the extent he

benefited the group, he was evaluated more positively. But from each of the two subjects' point of view a third team member was present who was not responsible for the improvement in group fortunes. The experimental manipulations had no influence on the attractiveness of this team member. Thus evaluations of a contiguous, non-instrumental entity were not affected. This instance of a contiguous object being irrelevant in so far as attitudinal processes are concerned may be contrasted with Aronson's (1961) investigation in which evaluations of stimuli contiguous with instrumental consequences were modified.

Aronson (1961) has recently proposed and tested a two process analysis of the formation of attitudes toward entities contiguous with instrumental consequences. He suggests that dissonance is aroused whenever expenditure of effort is great. Thus an inverse relationship between being rewarded and liking for contiguous stimuli should occur only when considerable instrumental effort is expended. When effort is slight, however, stimuli contiguous with reward will be more attractive than those contiguous with non-reward as experiments on secondary reinforcement would suggest. In his experiment, subjects "fished" and "caught" red or green containers. One color container always held coins while the other did not. Container color did not serve as an instrumental cue because subjects were unable to tell which color container they would get. Easy or more effortful methods of snaring the containers were used. As expected the color contiguous with reward became relatively more attractive than that contiguous with non-reward in the Low Effort conditions. For the High Effort group no difference

in relative attractiveness of the two colors was found, though it had been predicted that the color contiguous with non-reward would be more attractive for these subjects. Aronson attributes this lack of difference to the simulteneous operation of dissonance and secondary reinforcement processes in the High Effort condition. The resultant of these opposed forces yields no change in attractiveness. Regardless of the adequacy of this particular explanation, a more basic question must be raised concerning the relevance of this investigation to the problem under consideration.

Since this paper is primarily concerned with attitudes toward directly instrumental events and actions, the Aronson investigation is not clearly relevant to the problem at hand. It is true that neither dissonance theory nor the secondary reinforcement concept of reinforcement theory assumes that instrumental linkage is a necessary condition for the development of attitudes toward entities. According to both formulations, contiguity alone is sufficient. (Dissonance theory does have somewhat different implications than reinforcement theory in regard to the contiguity question. According to the concept of secondary reinforcement, all objects contiguous with reinforcement will acquire reinforcing properties, i.e., develop greater attitudinal positivity. Dissonance theory predicts that the only changes in attitude which occur will be those that increase the number of cognitions consonant with current behavioral commitment. Thus dissonance theory would predict that in certain cases, objects contiguous with reinforcing conditions will become more negative attitudinally-- as happens when a person rejects one goal object in favor of another.) But, although instrumental entities are

always contiguous to their consequences in some respect, contiguous entities are not always instrumental. And, it is not really clear that sheer contiguity of an entity with goal attainment is sufficient to influence attitudes toward that entity. Consequently, the scope of the present paper will be restricted to those situations in which there is a clear instrumental linkage between the entity and goal attainment. In this light, Aronson's investigation must be regarded as a variant of the general problem of the relation between incentives and attitudes, a variant which shall not be considered here. Nevertheless, Aronson's two-process approach to the general problem does provide a useful paradigm for the theoretical analysis which occurs in the following chapter.

CHAPTER II

THEORETICAL STATEMENT AND HYPOTHESES

A Two-Process Analysis of Attitude Formation

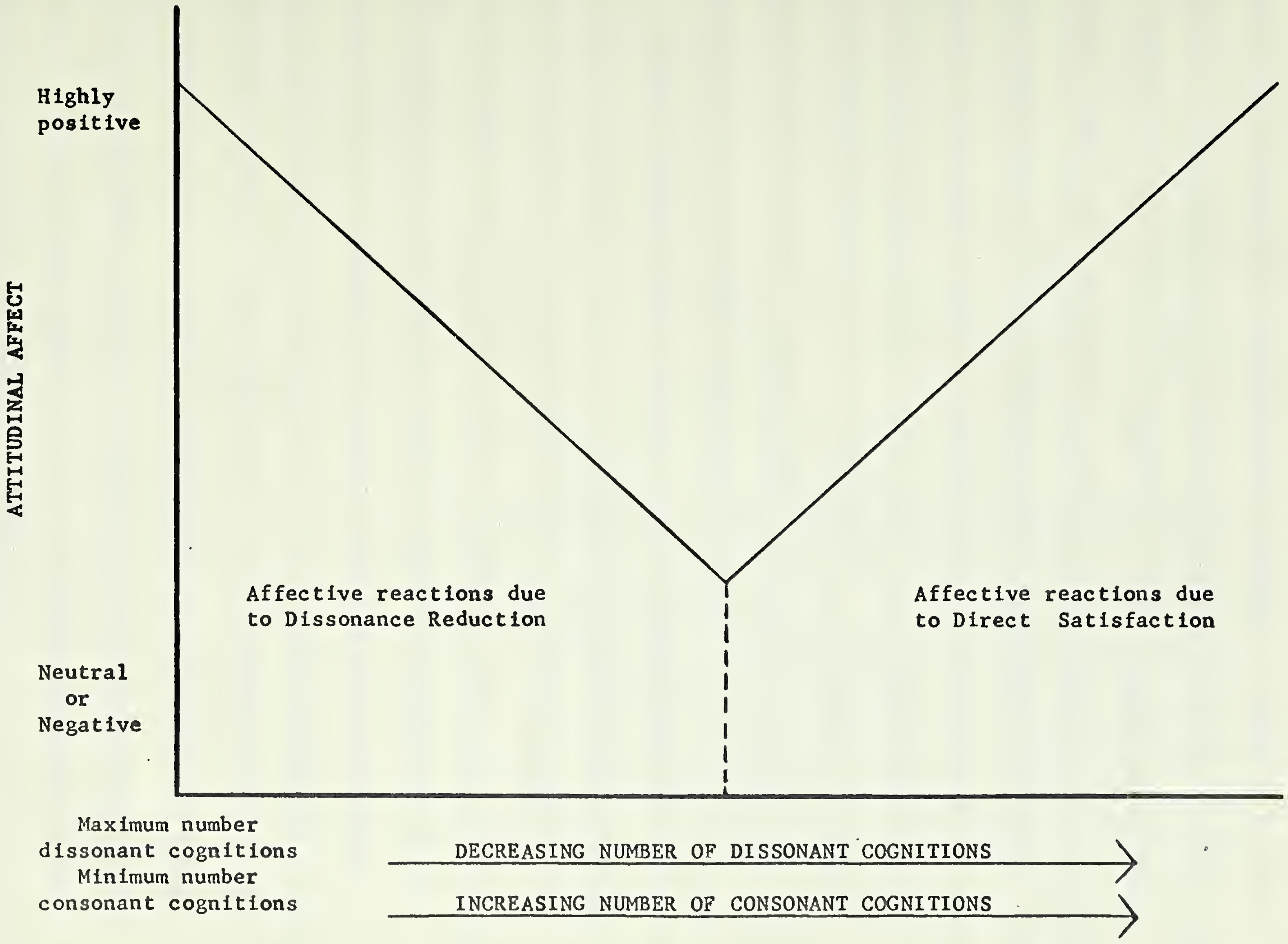
The formation of attitudes. Like Aronson's (1961) investigation, the present study proposes and tests an hypothesis of two-process determination of attitudinal affect. Certain basic preconditions must be present if this hypothesis is to predict outcomes accurately. Brehm and Cohen (in press) suggest that cognitive dissonance can be aroused only when a person has a definite behavioral commitment which has been established voluntarily. Consequently, the present hypothesis is restricted to those situations in which persons feel they have had some choice about whether or not to commit themselves to a course of action which has motivational consequences or which leads to events having such consequences. Given this precondition, dissonance arises whenever the proportion of dissonant cognitions is relatively high. Under these conditions, the addition of relatively small numbers of consonant cognitions merely decreases the magnitude of dissonance with the result that dissonance reducing increments in attitudinal positivity toward the entities involved are

not as great. When the proportion of consonant cognitions is relatively high, however, another process may guide attitude formation and change. Under these conditions, those consonant cognitions commonly called incentives give rise to satisying affects which increase the positivity of attitudes toward activities and objects instrumental in obtaining these incentives. Since dissonant cognitions are absent or relatively small in number, no intervening dissonance processes would occur. There would simply be a spread of positive affect to the instrumental entity, i.e., a direct satisfaction effect.

A theoretical curve illustrating the two-process determination of attitudinal affect is shown in Figure 1. Attitudinal affect on the ordinate is plotted as a function of relative numbers of dissonant and consonant cognitions. The left hand side of the abscissa originates at the point where the number of consonant cognitions just excedes the number which are dissonant. Dissonant cognitions in excess of this limit would lead to psychological renunciation of the behavioral commitment. Movement away from the origin along the abscissa represents decreasing numbers of dissonant cognitions and increasing numbers of consonant cognitions. The slope of the two arms of the curve is arbitrary, of course. Furthermore, it may well be that the curve is a lop-sided V with one arm rising more rapidly than the other. In the absence of guiding theoretical formulations and relevant evidence, however, a symmetrical curve has been assumed.

The predicted relationship between Attitudinal Affect and the proportion of dissonant or consonant cognitions is a non-monotonic V-curve. When the number of dissonant cognitions is zero or small enough to be

Figure 1. Theoretical curve of two-process determination of attitudinal affect toward activities to which one is committed and toward objects one is committed to having commerce with.


Highly positive
ATTITUDINAL AFFECT
Neutral or Negative
Affective reactions due to Dissonance Reduction
Affective reactions due to Direct Satisfaction
Maximum number dissonant cognitions
Minimum number consonant cognitions
DECREASING NUMBER OF DISSONANT COGNITIONS
INCREASING NUMBER OF CONSONANT COGNITIONS

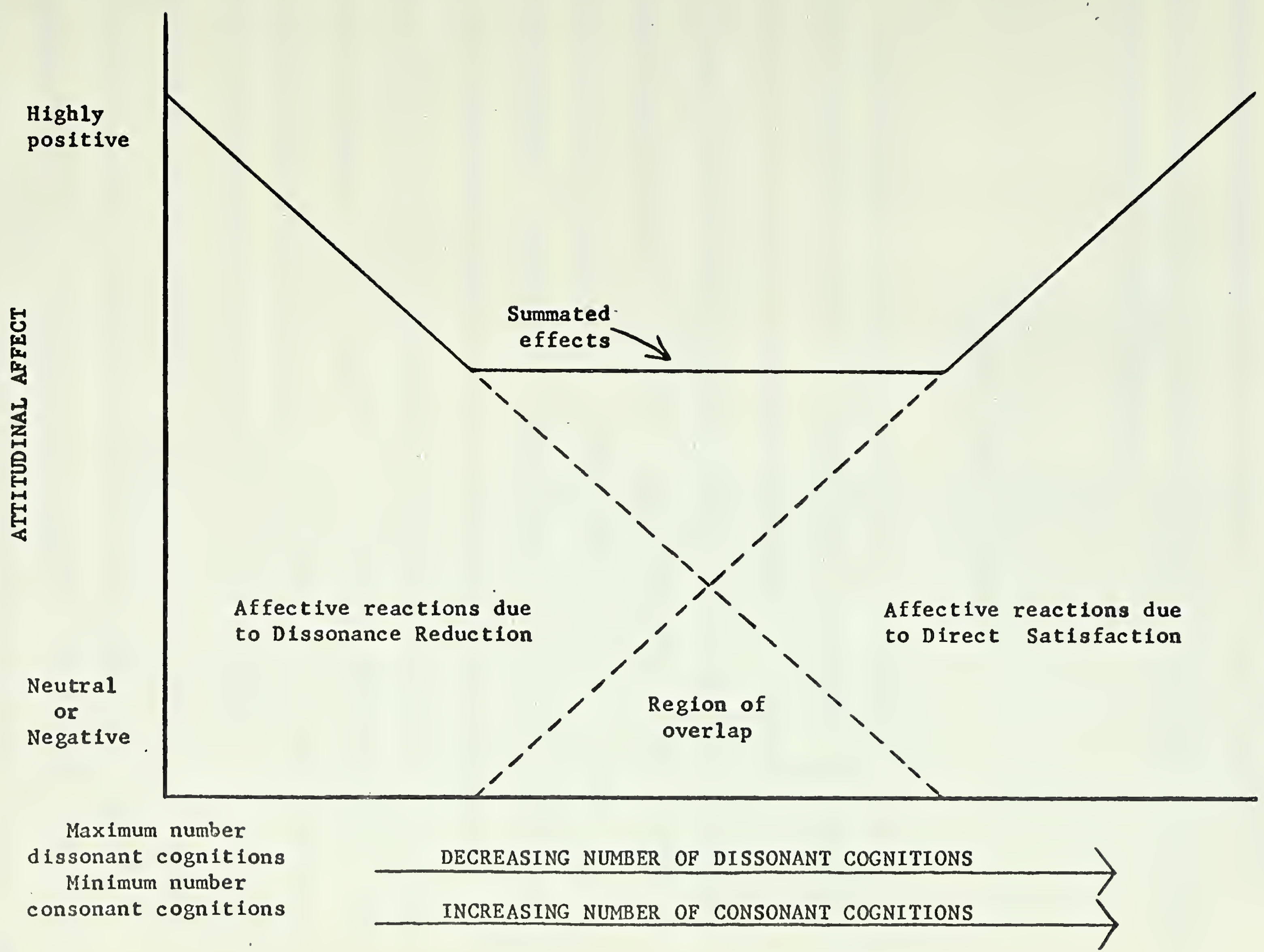
psychologically insignificant, dissonance processes cease to operate. A second process takes over and attitudinal positivity increases as a direct function of satisfaction-producing consonant cognitions such as reward. When the relative number of dissonant cognitions is high, however, attitudinal evaluation is likely to be determined by dissonance reduction with a resultant inverse relationship between attitudinal affect and incentive magnitude. Thus liking for instrumental activities and objects will be greatest at the extremes of the abscissa and lowest in the middle zone where neither dissonance or direct satisfaction effects are particularly strong. An important question concerns the location of the point at which the curve reverses direction, i.e., the point at which one process supercedes the other.

Figure 1 clearly shows that the point of transition from one process to the other lies well above the number of consonant cognitions just sufficient to ensure behavioral commitment (this latter point is at the origin). The probable location of the transition point at which the curve reverses direction is the lowest number of consonant cognitions which the individual deems reasonable and satisfactory as reasons for committing himself to a particular course of action. In other words, it is the point at which the number of dissonant cognitions is just small enough to be tolerated without concern. This latter assumption is clearly related to Rosenberg's (1960a, 1960b) view that the individual possesses a certain degree of tolerance for inconsistency. So long as the magnitude of inconsistency (number of dissonant cognitions in the present formulation) is below this threshold, motivation (dissonance) to restore consistency will be lacking.

Are dissonance and direct satisfaction processes really mutually exclusive? We have assumed that dissonance and direct satisfaction processes are mutually exclusive and that a sharp transition from one to the other takes place. However, there may well be a zone in which both processes operate with neither one being dominant. In this region both processes could operate at relatively low strength with summation of the resultant affect taking place. Figure 2 presents a theoretical curve of two-process determination of positive attitudinal affect in which there is a zone in which both dissonance and direct satisfaction processes operate simultaneously. (Except for the zone of overlap, Figures 1 and 2 are identical.) The amount of overlap shown is arbitrary. As seen in Figure 2, the assumption that similar affects will summate despite differences in origin (one produced by dissonance, the other by direct satisfaction), leads one to expect a region of relative flatness at the base of the curve. Together with the assumption of approximately equal slopes for each arm of the curve, the assumption of overlapping processes producing similar affects which summate yields a U-shaped rather than V-shaped function. This is illustrated by the curve of Summated Effects in Figure 2. Decrements in positivity produced by the weakening of one process would be offset by increments in positivity produced by the strengthening of the other process. The dotted lines below the curve of Summated Effects in Figure 2 illustrate the underlying psychological processes.

It is not known whether dissonance and direct satisfaction processes are mutually exclusive or whether there is a region in which they operate simulteneously. Thus it is not known whether a V-shaped (Figure 1) or U-shaped

Figure 2. Theoretical curve of two-process determination of attitudinal affect. Dissonance and Direct Satisfcation effects are assumed to overlap and summate.


Highly
positive
ATTITUDINAL AFFECT
Neutral
or
Negative
Summated
effects
Affective reactions due
to Dissonance Reduction
Affective reactions due
to Direct Satisfaction
Region of
overlap
Maximum number
dissonant cognitions
Minimum number
consonant cognitions
DECREASING NUMBER OF DISSONANT COGNITIONS
INCREASING NUMBER OF CONSONANT COGNITIONS

(Figure 2) curve more accurately describes the relationship between attitudinal affect and the proportions of dissonant and consonant cognitions. Since the V-curve relationship depicted in Figure 1 is the simpler of the two, it shall be used as a working hypothesis.

Experiment and Hypotheses

The procedure of the present experiment is modeled after that used by Leventhal and Brehm (in press). Subjects are asked to commit themselves to several hours of work at a rather unappealing task for a reward. Post-commitment ratings of liking for the activity and satisfaction with participating in the study are then obtained. Increasing the magnitude of reward given for a set amount of work is assumed to increase the number of consonant cognitions. Decreasing the initial attractiveness of the instrumental activity is assumed to increase the number of dissonant cognitions. Accordingly, the two variables manipulated in the present study are reward magnitude and instrumental task attractiveness. It is hypothesized that as a joint function of these variables, the positivity of attitudes toward the activity and situation will follow the V-curve pattern depicted in Figure 1. If our reasoning is correct, three appropriately selected levels of reward in combination with a non-attractive instrumental activity should generate a V-curve relationship between reward magnitude and liking for that activity. The middle reward value should be the lowest amount the individual deems reasonable and appropriate for performance of that activity. Since this is the point of

transition from dissonance to direct satisfaction processes and vice versa, the magnitude of positive affect should be lowest at this location because both processes would be relatively weak. The low reward level will be a high dissonance condition. The high reward level will be a "high consonance" condition in which direct satisfaction processes are operating. More positive attitudes should be manifest at both these reward levels than at the middle level.

The two-process analysis also suggests that variations in initial liking for the activity (i.e., variation in the relative number of dissonant cognitions) at two appropriately selected levels of reward (moderate and high) are capable of reversing the slope of the relationship between post-commitment liking for the activity and reward magnitude. If the task is relatively neutral or only mildly unattractive (i.e., the relative number of dissonant cognitions is fairly small), a direct satisfaction effect will occur with liking for the activity being greatest at the high reward level. If the task is highly negative in character, however, the number of dissonant cognitions will be very large and a dissonance process will operate. Increasing the amount of reward under these conditions will simply decrease the magnitude of dissonance with the result that liking will be greater at the moderate reward level. Of course, there is an upper limit on the amount of increase in reward beyond which increase in the number of consonant cognitions would set a direct satisfaction process into operation.

CHAPTER III

METHODS

Subjects (Ss) were 71 male student volunteers from introductory psychology classes at Duke University. Each S was seen individually by a male experimenter (E). Upon arriving at a supposed study of Mental Efficiency, S was told: "We're studying the variations in a person's performance when he works at something for a long period of time without stopping. This is a preliminary session and it won't last long. If you decide to participate, if you decide to come back, you would be returning for a three hour session of continuous work in about a week... I'm going to tell you some more about the experiment so you can get a better idea of what it consists. In this way you'll be able to make up your mind as to whether or not you want to take part in it."

Ss were then offered either 2, 4, or 8 experimental credit points for the three hour testing session and preliminary session combined. Experimental credit points are awarded to students whenever they participate in out-of-class experiments. Because credit points contribute to students' final grades they are highly valued. Ordinarily one credit point is received

for approximately 30 to 60 minutes of a student's time. During pilot work 26 trial Ss were asked to indicate the number of credit points they expected to receive. The question was presented in written form after the above-quoted statement but before any mention of credit points was made. The question was: "Considering how many credit points would be a fair amount to receive for taking part in this experiment, how many do you expect to get?" S answered by circling a number from one to 11 (The form used is shown in Appendix B). The mean expectation was 3.54 credit points with answers ranging from two to six.

S was told he would spend the three hour testing session working on the Number Copying Task. The mechanics of the task were explained and S was asked to sample it for himself. A stack of about 100 3" x 5" white cards was in front of him. Each card contained a row of 10 digits (taken from a random number table) spaced a quarter inch apart, The task was to copy these numbers directly into the columns of a special answer sheet (see Appendix C). S had 11 seconds to transfer the numbers from a card to the appropriate column. Within that time he could work at his own pace but was not allowed to go on to the next card until a buzzer sounded. If S had not finished he was to go on to the next anyway (Scarcely any Ss were unable to copy down all 10 numbers in the time allotted). E had S run through 10 cards and then commented: "O.K. That's a sample of the task. You know what's involved in the experiment. If you agree to work at the Number Copying Task for three hours you'll receive (2, 4, or 8) credit points. Can I sign you up for the experiment?" If S was reluctant to commit himself, E pointed out

that *S* could choose any appointment time he wanted and made other encouraging comments if necessary. Only two *Ss*, both in the 2 Credit group, refused to participate. (One *S* who had no conception of the value of a credit point was also deleted.)

After *E* added *S*'s name to his list, an appointment time suitable to *S* was agreed upon. *E* had *S* fill out an appointment reminder slip listing date, time, and place of the testing session. After *E* mentioned that the (2, 4, or 8) credit points would be received following completion of three hours of work at the Number Copying Task, the first of three dependent measures was taken. *E* cited the "well-known fact" that how a person feels about something can influence how he does when he works at it for a long period of time. Thus it was important that *E* have some idea of *S*'s feeling about the task. Liking for the activity was tapped by the question: "How much do you like working on the Number Copying Task?" An *a priori* rating scale of 101 points with 11 verbal labels was used. The labels (with accompanying scale scores) were: dislike greatest amount possible (0), dislike a very great amount (10), dislike quite a bit (20), dislike a moderate amount (30), dislike a little (40), neither (50), like a little (60), like a moderate amount (70), like quite a bit (80), like a very great amount (90), like greatest amount possible (100). This measure is referred to hereafter as the Activity Affect Scale (see Appendix D).

A less direct index of attitude was then obtained. *E* explained that occasional two minute long "Change-of-pace Rest Periods" were allowed during the three hour testing session. During these periods *S* would work at something else though basically he would have a rest. In deciding how often he

would like to have these two minute periods, S was asked to circle a number (of minutes) from zero to 30. Presumably, the more S likes the task the less often he desires a rest period and the higher the number he is apt to circle. (The form used to assess desired frequency of rest is shown in Appendix E). E went on to say that a person's feelings about the "general situation" can also have effects so it was necessary to know how S felt about this, too. The following question provided a measure of the overall attractiveness of the experimental situation. "All things considered, how do you feel about taking part in this experiment?" A 101 point scale with 11 verbal labels was used. These were: as displeased as possible (0), displeased a very great amount (10), displeased quite a bit (20), moderately displeased (30), slightly displeased (40), neither (50), slightly pleased (60), moderately pleased (70), pleased quite a bit (80), pleased a very great amount (90), as pleased as possible (100). This measure is referred to hereafter as the Participation Affect Scale (see Appendix F).

Following the final rating, S was informally asked to evaluate the amount of credit points he was receiving, whether he felt it was adequate and more or less than expected. After S explained his feelings and it was clear the deception had been successful E revealed the deception and explained the true purpose of the experiment. Of the 68 Ss who agreed to participate in the experiment, none seemed to be aware of the deception. Generally Ss were surprised and amused. All agreed it was important for them to say nothing about the study.

For the three groups just discussed, the Number Copying Task and S's

part in the experiment were described in a rather neutral fashion. These groups shall be referred to as the 2, 4, and 8 credit Neutral Instruction groups. To test predictions about the effects of varying activity attractiveness two additional groups were run. Ss in these groups were offered either 4 or 8 credit points. E's comments to these Ss were designed to present the task and S's role in the experiment in a highly unfavorable light. These 4 and 8 Credit Negative Instruction groups were intended for comparison with 4 and 8 credit Ss who had received the Neutral Instructions. The complete instructions for the Neutral Instruction condition are presented in Appendix A. The first three paragraphs of this set of instructions should be examined closely since the only difference between the Negative Instruction and Neutral Instruction conditions is in the nature of E's initial comments. The Negative Instructions began as follows. "We're studying the variations in a person's performance when he works at something for a long period of time without stopping. Subjects who take part in the experiment work at a highly repetitious and extremely dull task for three solid hours. Now you don't have to take part in this experiment if you don't want to. This is a preliminary session and it won't last long. If you decide to participate, if you decide to come back, you would be returning for a three hour session of continuous work in about a week. I'm sure your schedule is quite busy but ours is very flexible so it should be possible to make a convenient arrangement with regard to time. I'm going to tell you some more about the experiment so you can get a better idea of what it consists. In this way you'll be able to make up your mind as to whether or not you want to take part in it.

"The task being used is called Number Copying and most people find it very unpleasant to work at it for anything more than a very short period of time. It's doing the same simple thing over and over. It's uninteresting and it becomes very tiring after a while. Usually it becomes extremely frustrating because it becomes impossible to do a decent job on it. So it can get pretty aggravating after you've worked at it for a while. It won't be fun.

"More generally I can't tell you much about the experiment. You won't find out how you do and you won't find out the results of the study. There won't be any time for me to tell you anything about the problem or the ideas we have so you won't learn very much from being in it. In so far as experimental credit points are concerned, due to the repetitious and uninteresting nature of the work and the great amount of boring work you have to do, you'll get (4 or 8) . -- and considering what you have to do that's really not very much.

"I'll let you try the task out right now. This will be a sample of the experiment. Except, of course, during the experiment there would be much more. Write your name on this sheet (etc.)."

In other respects the Negative Instruction and Neutral Instruction conditions were identical.

Table 1 summarizes the experimental design. Its cells contain _N_s for each group. It may be seen that the study actually consists of two overlapping experimental designs or sets of comparisons. The first set of comparisons involves the 2, 4, and 8 Credit Neutral Instruction groups. In this analysis a V-curve relationship between reward and the dependent attitude measures

Table 1

Summary of Design and Number of Ss in Each Group

Instructions	Reward 2 Credits	 4 Credits	 8 Credits
Neutral	13	14	13
Negative		14	14

is expected. The second set of comparisons is a two by two table composed of the Instructions Variable and the 4 and 8 Credit reward levels. A significant interaction is expected in this table with the relationship between reward and the dependent measures being positive when Neutral Instructions are used and negative when Negative Instructions are used.

CHAPTER IV

RESULTS

Means and variances for both Affect Scales are shown in Table 2. Mean scores for all groups on the Activity Affect Scale are presented graphically in Figure 3, those for the Participation Affect Scale in Figure 4. The similar pattern of results in these Figures suggests a high correlation between the Activity Affect and Participation Affect Scales. The overall r for all 68 *Ss* is +.85 which is highly significant.

Results of t test comparisons are presented in Table 3. As an additional check, Fisher Exact Probability tests were also applied. Two by two tables were constructed for this purpose by splitting each combined pair of groups as closely to the median as possible. Probability values for these tests also appear in Table 3.

Considering differences between *Neutral* Instruction groups (Comparisons a, b, and c), Table 3 reveals that means for 2 Credit Neutral and 4 Credit Neutral *Ss* hardly differ on either Affect Scale. Fisher test results show that 8 Credit Neutral *Ss* have significantly higher ratings than 2 Credit Neutral *Ss* on the Activity Affect and Participation Affect Scales. The t tests for these two comparisons indicate only moderate support for a difference

Table 2

Means and Variances of All Groups for the Activity Affect Scale and Participation Affect Scale

		Reward 2 Credits	 4 Credits	 8 Credits
Activity Affect Scale:				
Neutral Instructions	Mean	67.08	66.14	76.15
	Var.	127.41	215.06	140.64
Negative Instructions	Mean	-- --	53.86	60.50
	Var.	-- --	240.59	273.19
Participation Affect Scale:				
Neutral Instructions	Mean	69.08	70.14	75.77
	Var.	70.41	126.13	105.36
Negative Instructions	Mean	-- --	60.00	68.14
	Var.	-- --	148.00	86.75

($\underline{P} < .10$). No 4 Credit Neutral versus 8 Credit Neutral comparisons attain significance though the difference for the Activity Affect Scale does reach the .10 level. Thus with Neutral Instructions, the high reward (8 Credit) group manifests more positive attitudes toward the instrumental activity and situation than either intermediate (4 Credit) or low reward (2 Credit) groups, though the difference is clear only in the latter case. Low and Intermediate reward Neutral Instruction Ss do not differ.

Figure 3. Mean Activity Affect Scale scores for all groups.

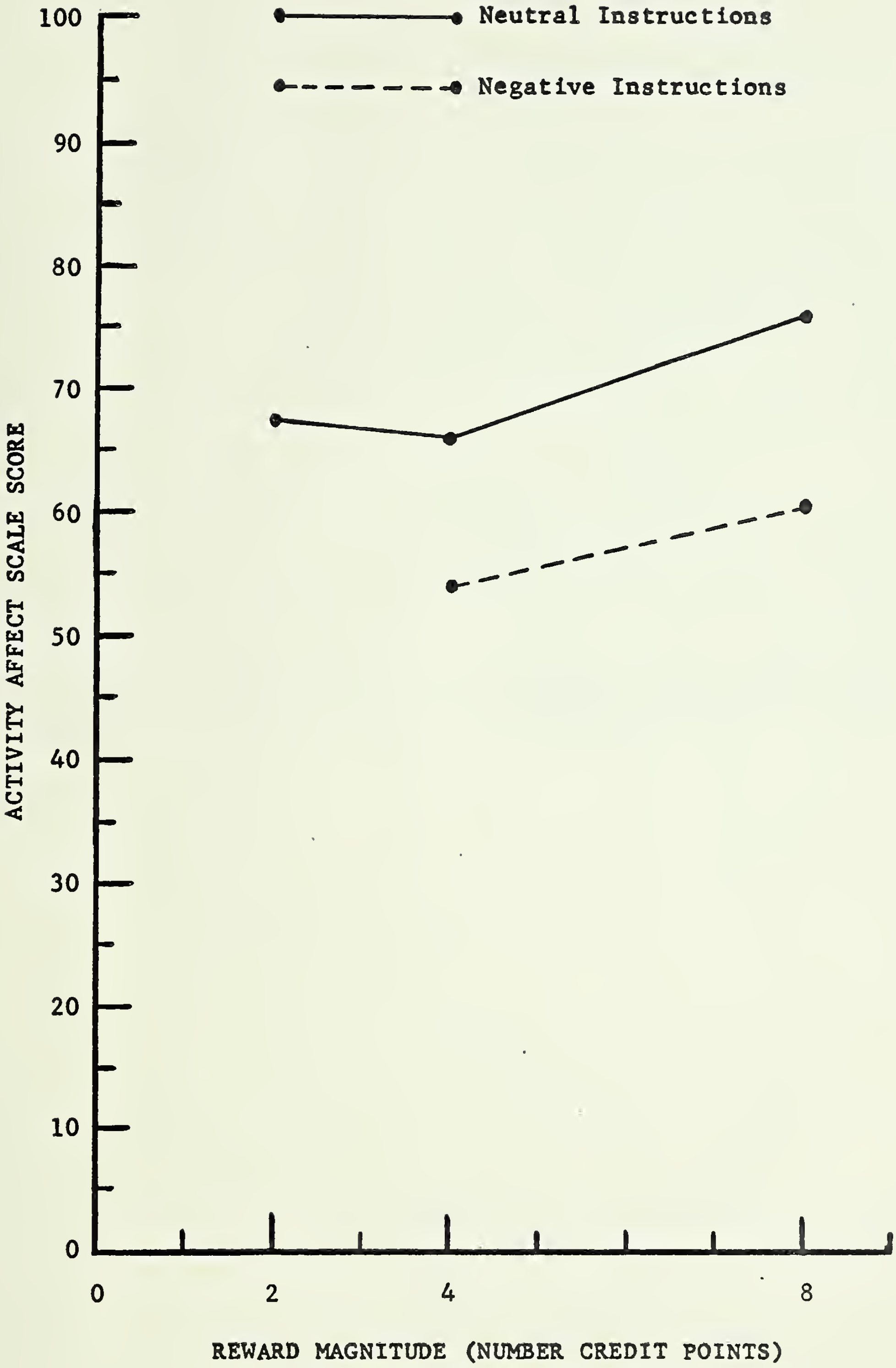

Neutral Instructions
Negative Instructions
ACTIVITY AFFECT SCALE SCORE
100
90
80
70
60
50
40
30
20
10
0
0
2
4
8
REWARD MAGNITUDE (NUMBER CREDIT POINTS)

Figure 4. Mean Participation Affect Scale scores for all groups.

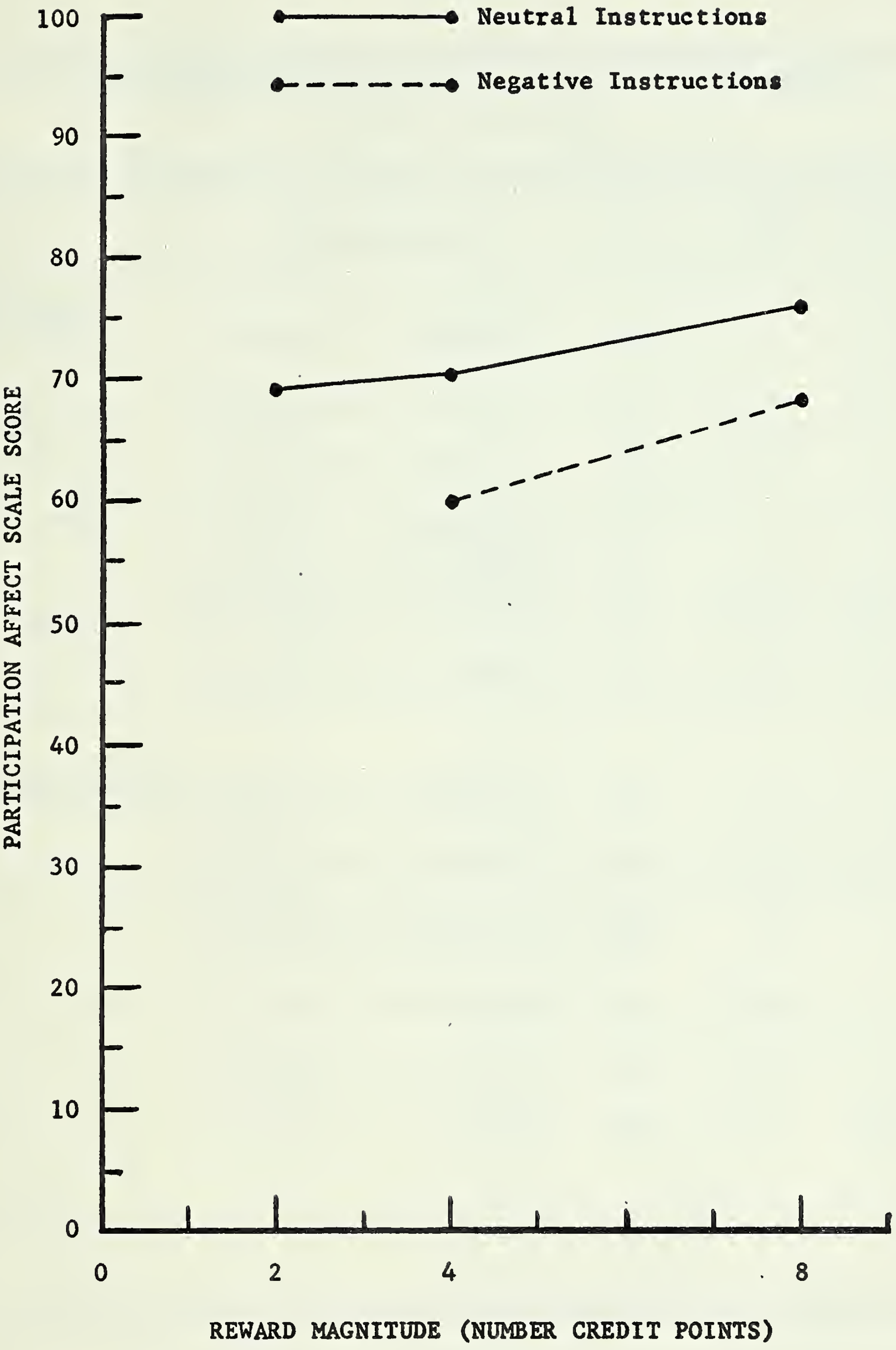

Neutral Instructions
Negative Instructions
PARTICIPATION AFFECT SCALE SCORE
100
90
80
70
60
50
40
30
20
10
0
0
2
4
8
REWARD MAGNITUDE (NUMBER CREDIT POINTS)

Table 3

t Test and Fisher Exact Probability Test Comparisons Between Groups for Both Affect Scale (All tests are two-tailed)

		Comparison	*t*	*P* value	Fisher Test *P* Value
Activity Affect Scale	a)	2 Neutral Vs. 4 Neutral	.18	--	--
	b)	2 Neutral Vs. 8 Neutral	2.00	<.10	<.02
	c)	4 Neutral Vs. 8 Neutral	1.94	<.10	--
	d)	4 Negative Vs. 8 Negative	1.10	--	--
	e)	4 Negative Vs. 4 Neutral	2.15	<.05	<.10
	f)	8 Negative Vs. 8 Neutral	2.81	<.01	<.10
Participation Affect Scale	a)	2 Neutral Vs. 4 Neutral	.28	--	--
	b)	2 Neutral Vs. 8 Neutral	1.82	<.10	<.02
	c)	4 Neutral Vs. 8 Neutral	1.36	--	--
	d)	4 Negative Vs. 8 Negative	1.99	<.10	--
	e)	4 Negative Vs. 4 Neutral	2.29	<.05	--
	f)	8 Negative Vs. 8 Neutral	2.02	<.10	<.05

Two by two analyses of variance were conducted for 4 Credit and 8 Credit groups at both levels of Instruction. The 2 Credit Neutral group is excluded from these tests. Summaries of these analyses for both Affect Scales are presented in Tables 4 and 5. For both attitude measures the

Table 4

Summary of Two by Two Analysis of Variance for the Activity Affect Scale (2 Credit Neutral Ss are excluded from this analysis)

Activity Affect Scale

Source	df	SS	MS	F
Reward	1	887.88	887.88	4.06*
Instructions	1	2611.77	2611.77	11.93**
Reward X Instructions	1	96.57	96.57	.44
Within Groups	51	11162.62	218.88	
Total	54	14758.36		

*$P < .05$
**$P < .01$

Table 5

Summary of Two by Two Analysis of Variance for the Participation Affect Scale (2 Credit Neutral Ss are excluded from this analysis)

Participation Affect Scale

Source	df	SS	MS	F
Reward	1	625.05	625.05	5.35*
Instructions	1	1059.72	1059.72	9.08**
Reward X Instructions	1	52.48	52.48	.45
Within Groups	51	5955.74	116.78	
Total	54	7692.98		

*$P < .05$
**$P < .01$

the interaction effect is virtually nil. For each, both main effects are significant. Regardless of type of Instructions, 8 Credit groups have more positive attitudes than 4 Credit groups. As shown clearly in Figures 3 and 4, the Negative Instructions produce a simple across-the-board drop in ratings which is statistically significant for both Affect Scales. Statistical comparisons between pairs of groups in the two by two design are presented in Table 3 (Comparisons c, d, e, and f). As suggested by the analysis of variance summary tables, these contrasts show the Instructions manipulation was somewhat more powerful than the reward manipulation. No 4 Credit versus 8 Credit *t* values or Fisher Test *P* s are significant (Comparisons c and d). All Instructions contrasts (Comparisons e and f) are significant by one test or the other. (For more detailed reports of data from the Affect Scales see Appendices G and H in which data for individual *S*s are presented.)

An indirect index of attitude is provided by Desired Frequency of Rest Period scores. Means and variances of this measure are shown in Table 6. Mean scores are graphically represented in Figure 5. These data are generally consistent with results of the Activity Affect and Participation Affect Scales, although none of the comparisons paralleling those presented in Table 3 approach statistical significance. Table 7 summarizes a two way analysis of variance from which 2 Credit Neutral Instruction *S*s are excluded. As with the Affect Scales, the predicted interaction is completely absent. The reward magnitude effect approaches significance ($P <.10$) though the Instructions variable apparently failed to influence Desired Frequency of Rest Period scores. The relative impact of the two variables on

Table 6

Means and Variances of Scores of All Groups for Desired Frequency of Rest Period (Higher numbers represent less frequent rest period)

		Reward		
Instructions		2 Credits	4 Credits	8 Credits
Neutral	Mean	14.69	16.00	17.69
	Var.	17.23	21.06	27.56
Negative	Mean	-- --	15.43	17.64
	Var.	-- --	29.65	35.48

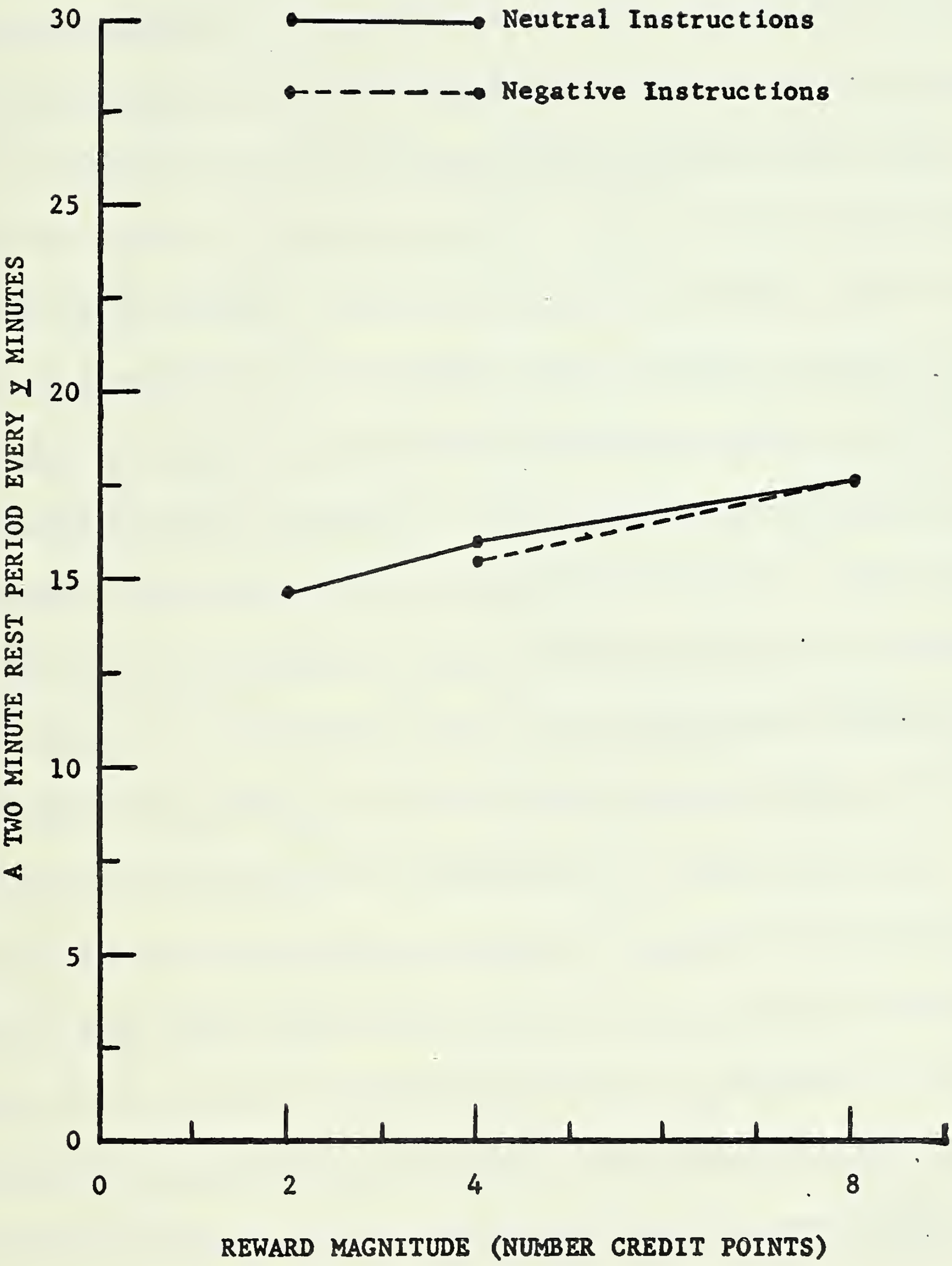
Table 7

Summary of Two by Two Analysis of Variance for Desired Frequency of Rest Period Scores (2 Credit Neutral Ss are excluded from this analysis)

Source	df	SS	MS	F
Reward	1	87.55	87.55	3.08*
Instructions	1	1.35	1.35	.05
Reward X Instructions	1	.95	.95	.03
Within Groups	51	1451.13	28.45	
Total	54	1540.98		

* $\underline{P} < .10$

Figure 5. Mean Desired Frequency of Rest Period for all groups.


Neutral Instructions
Negative Instructions
30
25
20
15
10
5
0
A TWO MINUTE REST PERIOD EVERY Y MINUTES
0
2
4
8
REWARD MAGNITUDE (NUMBER CREDIT POINTS)

this index seems opposite the pattern found for Affect Scale ratings. For the latter, the Instructions variable was the more powerful manipulation. The near overlap of curves for Neutral and Negative Instructions in Figure 5 contrasts sharply with the large separation between them in Figures 3 and 4.

The insensitivity of Desired Frequency of Rest scores as a dependent variable is probably due to *Ss*' tendency to think in terms of five minute units. Scores clustered at 10, 15, and 20 minutes. Few *Ss* went over 20 or under 10 in making their decision. The use of parametric statistics with such apparently non-normal data is questionable. Consequently, combined 4 and 8 Credit groups were split as closely to the median as possible and χ^2 analyses were performed (see Appendix J). The results of these analyses conform closely to those obtained with the analysis of variance. The reward variable (4 versus 8 Credit *Ss* as shown in Table *a* of Appendix J) yields a nearly significant χ^2 of 3.07 ($P < .10$). The Instructions variable (Neutral versus Negative Instruction *Ss* at 4 and 8 Credit reward levels as shown in Table *b* of Appendix J) yields an insignificant χ^2 smaller than one.

As for the correlation between Desired Frequency of Rest Period scores and Affect Scale scores, the overall Pearson *r* between Desired Frequency of Rest[*] and the Activity Affect Scale is +.26 which is low but significantly different from zero ($P < .05$). That between Desired Frequency of Rest and the Participation Affect Scale is −.02 which is not significant.

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[*] The large number of tied ranks for the Desired Frequency of Rest Scores precludes the use of non-parametric correlation measures.

Since the Activity Affect and Desired Frequency of Rest indices are more directly dependent on evaluation of the task than is the Participation Affect Scale, this pattern of relationships is not surprising.

CHAPTER V

DISCUSSION AND CONCLUSIONS

Results of Neutral Instruction Groups

Data from the three Neutral Instruction groups provide slight support for the V-curve hypothesis. Increasing reward beyond a reasonable, intermediate amount does increase attitudinal positivity but affective reactions appear to be unchanged when reward drops below this level. Several explanations can account for the absence of difference between 4 Credit Neutral and 2 Credit Neutral groups.

If the transition point between dissonance and direct satisfaction processes lay midway between the 2 and 4 Credit reward levels, attitudinal positivity would be expected to be approximately equal at these points. The lower limit of the V-curve function would fall between them and they would lie at the same height on opposite arms of the curve. Considering that 3.54 credit points was the mean expectation for reward under Neutral Instructions, however, the 4 Credit Neutral group was actually considerably closer to the theoretical point of reversal in the curve than the 2 Credit Neutral group. Consequently, this explanation appears to be inappropriate.

The possibility that only direct satisfaction processes were operating. It could be argued that dissonance effects were entirely absent from all Neutral Instruction groups. In this case, any differences between groups would be attributed to the operation of a direct satisfaction type process. This view would maintain that the similarity between 2 and 4 Credit Neutral groups occurs because the psychological distance between 2 and 4 credit points is not as great as the psychological distance between 4 and 8 credit points. Thus the mean attitude ratings of 2 Credit Neutral Ss should not be substantially lower than those of 4 Credit Neutral Ss. The fact that differences between 2 and 8 Credit Neutral groups were significant while those between 4 and 8 Credit Neutral groups were not, is consistent with this interpretation.

This single process explanation of the data implies that 2 and 4 Credit Neutral Ss were fairly similar psychologically. However, post-experimental interviews suggest these two groups of individuals felt rather differently in important respects. Seven Ss in the 2 Credit Neutral group clearly indicated they felt underpaid and unfairly treated (three others said the reward was lower than expected but still fair), but only one S in the 4 Credit Neutral group indicated any sort of dissatisfaction with the reward. Thus, the 2 and 4 Credit Neutral groups appear to differ as they were supposed to. (Twelve 8 Credit Neutral Ss felt they were receiving a reward greater than expected whereas only five 4 Credit Neutral Ss felt this way). Thus it would be erroneous to attribute the similarity between 2 and 4 Credit groups to the failure of their respective reward levels to produce differential effects.

On the contrary, if a direct satisfaction process was the only determinant of attitudinal affect, the 2 Credit Neutral group should have been noticeably lower than the 4 Credit Neutral group. Since this was not the case, some additional factor must have prevented the Affect Scale scores of 2 Credit Neutral Ss from dropping. Since this was the only Neutral Instructions group in which a dissonance process was expected to operate, it is reasonable to suppose that the additional factor was a dissonance reducing increase in attitudinal positivity.

The reward-attitude relation as a U-shaped function. The line of reasoning we have developed leads to a third alternative, viz., that the reward-attitude function is U-shaped rather than V-shaped. Instead of dissonance and direct satisfaction processes being mutually exclusive as originally postulated, there may be a zone in which both operate simultaneously with their effects summating to determine attitudinal affect. Thus Figure 2 rather than Figure 1 may be the more accurate depiction of the processes involved. If we assume that both 2 Credit and 4 Credit Neutral groups lie within the relatively flat region of the U-curve in which both processes operate, we would expect their affective reactions to be highly similar. The 8 credit reward level, however, is high enough to fall outside of and above this region. Consequently, 8 Credit Ss have more positive attitudes than those at lower reward levels.

This last alternative seems most acceptable as an explanation of the fact that 2 Credit Neutral Ss did not manifest higher ratings than 4 Credit Neutral Ss. The relatively weaker strength of *direct* satisfaction effects in

the 2 Credit Neutral group lowered the baseline from which the dissonance process produced its effect. If the U-curve hypothesis is correct, a group offered less than 2 credit points would probably have shown greater attitudinal positivity than the 2 Credit Neutral group. Further research is required to demonstrate that this is, in fact, the most adequate account of the pattern of results obtained for Neutral Instruction groups.

The Effect of Negative Instructions

The Negative Instructions were expected to increase the number of dissonant cognitions by decreasing activity attractiveness. As a consequence, a reversal in slope of the relation between 4 and 8 Credit reward levels and attitudinal positivity was predicted. In a sense, the Negative Instructions sought to make the 4 and 8 Credit Negative groups the theoretical equivalent, respectively, of the 2 and 4 Credit Neutral groups for which a similar relation between reward and attitude was predicted. Contrary to expectation, extremely low interaction _F_ s were obtained. No trend toward reversal of slope was present. At both Instructions levels 8 Credit _S_s had more positive attitudes than 4 Credit _S_s. The manipulation clearly had a strong impact in that a marked overall decrease in Affect Scale ratings was produced by the Negative Instructions. Nothing in the data suggest that a dissonance process was operating in either Negative Instructions group. The significance of this finding is equivocal, however, because the assumption that the Instructions variable actually altered activity attractiveness is questionable.

The Instructions variable and social interaction factors. The Negative Instructions may simply have served as a strong force inducing *S* to conform overtly with *E*'s negative characterization of the activity. *E*'s comments could have lead *S* to believe that *E* expected him not to rate the task and situation too highly. Thus, the decreased positivity in Affect Scale ratings could reflect *S*'s tendency to conform publicly to *E*'s expectations.

A second possible explanation of the effects of Negative Instructions would be that *E*'s comments reduced situational restraints against expression of negative affect. Sitting opposite *S* was an individual (*E*) of apparently higher status with a clear personal investment in the experiment. In this context, *Ss* could easily have felt that public expression of dislike and displeasure would constitute a direct insult or offense to the experimenter. *E*'s extremely negative description of the task and of *S*'s role in the experiment openly proclaims the unattractive nature of the activity. Clearly this would give *Ss* greater freedom to express dislike and displeasure. Rather than producing true change in *Ss*' attitudes, the Instructions manipulation may only have modified ratings by altering the situational interpersonal significance of public response to the Affect Scales. In contrast to the conformity analysis discussed above, this interpretation assumes that the activity was disliked by all *Ss* but that the degree to which this dislike was expressed changed as a function of the Instructions variable.

Both the *conformity* and *removal-of-restraints* interpretations assume the Instructions manipulation actually failed and that differences in Affect Scale ratings produced by the two sets of instructions do not represent real

changes in underlying attitude. Both interpretations lead one to expect that the two independent variables would not influence the Affect Scales and the Desired Frequency of Rest Index in the same manner. Reward should have a similar effect on both direct and indirect indices of attitude because it changes underlying affective reaction. The Instructions variable, however, should differentially influence these two types of dependent variables.

While the Negative Instructions clearly outlined E's expectations concerning S's response to the Affect Scales, little that E said would suggest that he had clear expectations regarding S's response to the Desired Frequency of Rest Period measure. Thus Negative Instructions would have little effect on the latter index. The removal-of-restraints interpretation leads to the same prediction because the Desired Frequency of Rest Period measure lacks the clearcut interpersonal implications of public response to the Affect Scales. Consequently, changes in situational restraints against expression of negative affect would have little impact on this indirect index of attitude. Substantive support for either of these interpretations can be found in the data.

Though the reward manipulation had a near significant effect on Desired Frequency of Rest Period, the Instructions variable had none. For the Affect Scales -- for which either conformity pressures or situational restraints would be quite strong -- the relative impact of the two variables tended to be reversed. The Instructions manipulation appeared to have a somewhat more powerful effect on both Affect Scales. Had the Negative Instructions actually decreased activity attractiveness, Desired Frequency of Rest Period scores should have been similarly affected.

It cannot be determined whether the conformity or removal-of-restraints interpretation is more accurate. Nevertheless, the data suggest that the absence of significant interaction effects between Reward and Instructions may be attributed to a flaw in experimental technique rather than theoretical statement.

Final Evaluation of the Data

Traditional views of attitude formation maintain that increasing goal magnitude and/or attractiveness of activity instrumental to goal attainment results in greater post-commitment increase in liking for that activity. Dissonance theory, on the other hand, analyzes the formation of attitudes toward an instrumental activity in terms of the magnitude of dissonance generated by cognitions dissonant or consonant with commitment to the activity. Because the amount of dissonance reducing increase in attitudinal positivity increases as the relative number of dissonant cognitions rises, dissonance theory predicts an inverse relationship between increase in goal magnitude and/or attractiveness of activity instrumental to goal attainment and amount of post-commitment increase in liking for that activity. According to the two-process formulation put forward to reconcile these contradictory views, dissonance processes operate to increase attitudinal positivity only when the number of dissonant cognitions is relatively high. When the relative number of consonant cognitions rises beyond a certain point, however, a direct satisfaction process operates and increases attitudinal positivity in pro-

portion to the number of consonant incentives. The least positive attitudes were expected to develop in the middle range where both processes would be relatively weak.

Because clear-cut dissonance effects were not obtained, the data are not consistent with a hypothesized V-curve relation between liking for the instrumental activity and relative numbers of consonant and dissonant cognitions. However, the results are consistent with the suggestion that the reward-attitude function is U-shaped rather than V-shaped. The U-curve conception appears to offer the most useful working hypothesis at the present time. Unfortunately, the experiment fails to offer definitive evidence concerning factors which determine the relation between reward and attitudes. It would be premature to reject or accept the two-process analysis of attitude formation which has been presented.

The study does demonstrate clearly that under certain conditions, raising reward magnitude increases post-commitment liking for activity instrumental to reward attainment. This finding suggests an important restriction on the range of applicability of Festinger's (1957) theory of cognitive dissonance which predicts an inverse relationship between these variables. When the number of dissonant cognitions is not relatively large, attitudinal affect is determined by a direct satisfaction process. Thus the proportion of consonant cognitions influences attitude formation not only by virtue of its role in determining the magnitude of dissonance but also directly by virtue of the satisfaction consonant incentives may produce.

Some Additional Research Possibilities and Theoretical Problems

A more adequate test of the two-process hypothesis could be obtained by several modifications of the experimental procedure employed. For example, a Neutral Instructions group offered a reward smaller than two credit points would clearly be a useful addition to the design. The notion of a U-shaped reward-attitude function suggests that such _S_s would manifest more positive attitudes than 2 or 4 Credit Neutral _S_s since the relative number of dissonant cognitions would be quite high for them. A serious methodological problem might arise with regard to getting _S_s offered one or no credits to agree to commit themselves to participate. For this reason 2 credits was the lowest reward used in the present study. However, the low refusal rate in the 2 Credit condition indicates that reward could be decreased further provided _S_s could be persuaded to tolerate an unusually low reward.

A second necessary procedural modification is to use an effective method for altering activity attractiveness. A relatively simple and satisfactory method of changing activity attractiveness would be to vary the amount of time _S_ was asked to work without making compensatory changes in the number of credit points being offered. Thus _S_s might have been offered 4 or 8 credit points and then asked to come back for several three-hour work sessions. This manipulation would produce a true decrease in activity attractiveness with the result that significant interactions between reward and activity attractiveness would presumably occur.

The two-process model raises a number of problems which suggest additional lines of research. The present study has been primarily concerned with the effect on attitudes of varying instrumental activity attractiveness and reward magnitude. But there are other ways of altering the relative numbers of dissonant and consonant cognitions. It may be that identifying a cognition as consonant or dissonant with a behavioral commitment is too gross a classification for accurate prediction. There may be subclasses of consonant or dissonant cognitions whose effect on attitudes will have to be considered separately. For instance,, assuming a relative number of consonant cognitions high enough to ensure the predominance of a direct satisfaction process, what would be the effect of adding consonant cognitions other than rewards? Would the addition of any kind of consonant cognition increase the positivity or intensity of direct satisfaction effects? Consider the case of an individual who commits himself to an activity in order to avoid punishment or to fulfill normative expectations. Increasing the amount of threatened punishment or strength of normative prescriptions would raise the number of consonant cognitions. Yet, it is not at all clear that such additions would result in more positive attitudes toward the instrumental activity. These types of consonant cognitions might not activate the direct satisfaction process produced by consonant rewards. It would be a relatively simple matter to design experiments which explore this issue. Until such questions are answered the generality of the two-process model presented here must be tentatively restricted.

Another important question concerns an earlier assumption that the

attitudinal affects stemming from the two underlying processes (i.e., dissonance and direct satisfaction processes) are essentially similar and additive. Certainly, it is possible to describe the effects of these two ways of changing the affective component of an attitude in the same quantitative terms, i.e., the attitude becomes more or less positive. This equating of attitudinal affect solely on the basis of intensity may be a great over simplification because there could be important qualitative differences in the kind of attitudinal modification produced by each process. The kind of liking for an instrumental activity or entity could be qualitatively different depending on the genesis of the attitudinal affect. Thus, the equally positive attitudes of two persons toward the same activity might not be similar if their attitudes were produced by different attitude formation processes. Even though the attitudes could be described as equally positive in simple quantitative terms, each might have somewhat different implications for future behavior. For example, attitudes established by one process might be more enduring and resistant to change than those established by the other. The comparative properties of attitudes established by these two different processes need to be studied.

If the two-process model is basically valid, a number of other theoretical and parametric problems would arise. One important problem would be to understand why one of the two attitude formation processes begins to operate or ceases to operate at a given point along the continua of relative numbers of dissonant and consonant cognitions. For the original V-curve hypothesis the specific form of this question concerned the location of the

transition point between dissonance and direct satisfaction processes. For the U-curve hypothesis it becomes a matter of discovering the determinants of the location of the region of relative flatness. In this regard, it is important to identify the variables which determine the relative number of dissonant cognitions that must be present for a dissonance process to operate.

Even if the two-process model's general conception of the shape of the reward-attitude function is correct, there remains a set of questions concerning the variables controlling the overall height of the curve. It is not known what factors determine the absolute intensity of attitudinal affect. Available evidence cannot answer this question and others that have been raised. Perhaps, further attempts to test the validity of the two-process model will provide useful leads.

APPENDIXES

Appendix A

Complete Instructions for the Three Neutral Instruction Conditions

We're studying the variations in a person's performance when he works at something for a long period of time without stopping. This is a preliminary session and it won't last long. If you decide to participate, if you decide to come back, you would be returning for a three hour session of continuous work in about a week. I'm sure your schedule is quite busy but ours is very flexible so it should be possible to make a convenient arrangement with regard to time. I'm going to tell you some more about the experiment so you can get a better idea of what it consists. In this way you'll be able to make up your mind as to whether or not you want to take part in it.

In so far as experimental credit points are concerned, due to the length and nature of the experiment you'll get (2, 4, or 8) credit points. [The phrase, "due to the length and nature of the experiment" was excluded in the 2 Credit condition.] That would be both for this brief preliminary session and for the three hour testing session combined, (2, 4, or 8) credits for the entire package.

The task being used is called Number Copying and I'm going to let you

try it out right now. This will be a sample of the experiment. Except, of course, during the experiment there would be much more. Write your name on this sheet. [E hands S the special answer sheet used in the task.]

You see the large stack of cards in front of you? Take the top one and put it on the low deck next to it. There are 10 numbers there and what you do is to copy them down onto the sheet in the first column-- going down. At the sound of the buzzer, [E sounds buzzer] flip the first card and go on to the next writing those 10 numbers down into the second column-- again, going down. When the buzzer sounds again flip that card and go on to the next-- and so on. O. K.? Let's start. Begin at the sound of the buzzer. [S does 10 cards.]

O. K. That's a sample of the task. You know what's involved in the experiment. If you agree to work at the Number Copying Task for three hours you'll receive (2, 4, or 8) credit points. Can I sign you up for the experiment? [S is signed up. If S hesitates E reiterates that appointments can be at any time, etc.] What's your name? When would you like to come back? [An appointment time is discussed and one convenient to S is chosen. E asks S to fill out an Appointment Reminder Slip.] Fill this out so you'll have a reminder. You hold onto that and after you've worked at the Number Copying Task for three hours you'll receive the (2, 4, or 8) credit points.

Right now, I think it's a pretty well known fact that how a person feels about something can influence how he does when he works at it for a long period of time. So we want to get some idea of the way you feel about this

task. The way we go about doing this is by means of what's called a rating scale. And here it is. You can see that it consists of a whole range of possible answers to the question shown above. The way you answer it is by drawing a single vertical line - up and down - through any one of the 101 dots making up the row of dots. You can draw your vertical line through any one of the dots in the row but pick the one that's closest to the way you feel. And I want to know how you feel about it right now. Go ahead and fill it in. [S fills in Activity Affect Scale.]

During the three hour testing session you won't spend every moment working on the Number Copying Task. There will be periodic two minute long Change-of-Pace Rest Periods. During these two minute periods you'll work at something else but it will really be a rest. What I would like to know is how often you would like to have these Change-of-Pace Rest Periods. I'd like you to make a decision now. You'll work on the Number Copying Task for a certain number of minutes and then have a two minute Change-of-Pace Rest Period. Indicate how often you'd like to have them by circling one of these numbers. This would be the number of minutes you'll spend working on the Number Copying Task before having a two minute Rest Period. [S indicates desired frequency of rest period.]

How a person feels about the general situation can also have an effect so we'd like to get an idea of how you feel about this, too. Here's another rating scale. Answer this question. [S fills out Participation Affect Scale.]

Appendix B

Measure of Reward Expectancy Used With 26 Pilot Subjects

Considering how many credit points would be a fair amount to receive for taking part in this experiment, how many do you expect to get?

1 2 3 4 5 6 7 8 9 10 11

Appendix C

Number Copying Task Answer Sheet

NUMBER COPYING

answer sheet

Name ________________________________

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	___	___	___	___	___	___	___	___	___	___	___	___	___
2	___	___	___	___	___	___	___	___	___	___	___	___	___
3	___	___	___	___	___	___	___	___	___	___	___	___	___
4	___	___	___	___	___	___	___	___	___	___	___	___	___
5	___	___	___	___	___	___	___	___	___	___	___	___	___
6	___	___	___	___	___	___	___	___	___	___	___	___	___
7	___	___	___	___	___	___	___	___	___	___	___	___	___
8	___	___	___	___	___	___	___	___	___	___	___	___	___
9	___	___	___	___	___	___	___	___	___	___	___	___	___
10	___	___	___	___	___	___	___	___	___	___	___	___	___

	14	15	16	17	18	19	20	21	22	23	24	25	26
1	___	___	___	___	___	___	___	___	___	___	___	___	___
2	___	___	___	___	___	___	___	___	___	___	___	___	___
3	___	___	___	___	___	___	___	___	___	___	___	___	___
4	___	___	___	___	___	___	___	___	___	___	___	___	___
5	___	___	___	___	___	___	___	___	___	___	___	___	___
6	___	___	___	___	___	___	___	___	___	___	___	___	___
7	___	___	___	___	___	___	___	___	___	___	___	___	___
8	___	___	___	___	___	___	___	___	___	___	___	___	___
9	___	___	___	___	___	___	___	___	___	___	___	___	___
10	___	___	___	___	___	___	___	___	___	___	___	___	___

Appendix D

The Activity Affect Scale

How much do you like working on the number copying task?

dislike greatest amount possible	dislike a very great amount	dislike quite a bit	dislike a moderate amount	dislike a little	neither	like a little	like a moderate amount	like quite a bit	like a very great amount	like greatest amount possible

!....!

Appendix E

Index of Desired Frequency of Rest Period

Indicate (by circling) the number of minutes you want to work at the number copying task before having a "change-of-pace rest period."

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Appendix F

The Participation Affect Scale

All things considered, how do you feel about taking part in this experiment?

as displeased as possible	**displeased a very great amount**	**displeased quite a bit**	**moderately displeased**	**slightly displeased**	**neither**	**slightly pleased**	**moderately pleased**	**pleased quite a bit**	**pleased a very great amount**	**as pleased as possible**

!....!

Appendix G

Activity Affect Scale Scores for All Subjects

Group									
2 Credit-Neutral Instruc.		4 Credit-Neutral Instruc.		8 Credit-Neutral Instruc.		4 Credit-Negative Instruc.		8 Credit-Negative Instruc.	
S		S		S		S		S	
aa	70	ba	73	ca	95	da	50	ea	71
ab	66	bb	71	cb	72	db	58	eb	70
ac	66	bc	43	cc	84	dc	32	ec	78
ad	60	bd	50	cd	66	dd	53	ed	40
ae	60	be	60	ce	75	de	78	ee	28
af	63	bf	80	cf	70	df	70	ef	78
ag	80	bg	62	cg	72	dg	55	eg	50
ah	70	bh	52	ch	50	dh	37	eh	72
ai	85	bi	74	ci	74	di	75	ei	37
aj	70	bj	83	cj	95	dj	42	ej	50
ak	83	bk	94	ck	80	dk	28	ek	70
al	53	bl	50	cl	82	dl	68	el	72
am	46	bm	60	cm	75	dm	58	em	59
		bn	74			dn	50	en	72

Appendix H

Participation Affect Scale Scores for All Subjects

Group									
2 Credit-Neutral Instruc.		4 Credit-Neutral Instruc.		8 Credit-Neutral Instruc.		4 Credit-Negative Instruc.		8 Credit-Negative Instruc.	
S		S		S		S		S	
aa	70	ba	60	ca	80	da	50	ea	71
ab	72	bb	71	cb	74	db	74	eb	80
ac	62	bc	40	cc	78	dc	59	ec	75
ad	60	bd	60	cd	79	dd	73	ed	55
ae	70	be	67	ce	75	de	77	ee	59
af	70	bf	80	cf	50	df	70	ef	82
ag	75	bg	82	cg	85	dg	40	eg	60
ah	70	bh	70	ch	64	dh	50	eh	70
ai	87	bi	76	ci	80	di	50	ei	73
aj	70	bj	82	cj	90	dj	46	ej	50
ak	77	bk	75	ck	85	dk	50	ek	75
al	55	bl	70	cl	75	dl	68	el	65
am	60	bm	70	cm	70	dm	63	em	69
		bn	79			dn	70	en	70

Appendix I

Desired Frequency of Rest Scores for All Subjects
(A two minute rest period every *y* minutes)

Group									
2 Credit-Neutral Instruct.		4 Credit-Neutral Instruc.		8 Credit-Neutral Instruct.		4 Credit-Negative Instruc.		8 Credit-Negative Instruc.	
S		*S*		*S*		*S*		*S*	
aa	15	ba	10	ca	30	da	15	ea	20
ab	15	bb	20	cb	20	db	15	eb	20
ac	20	bc	15	cc	15	dc	10	ec	20
ad	10	bd	15	cd	20	dd	13	ed	10
ae	10	be	20	ce	20	de	20	ee	12
af	10	bf	10	cf	20	df	15	ef	15
ag	15	bg	7	cg	20	dg	25	eg	20
ah	8	bh	20	ch	10	dh	20	eh	20
ai	15	bi	12	ci	15	di	20	ei	20
aj	20	bj	20	cj	15	dj	10	ej	30
ak	20	bk	15	ck	20	dk	10	ek	15
al	15	bl	20	cl	10	dl	20	el	20
am	18	bm	14	cm	15	dm	18	em	5
		bn	10			dn	5	en	20

Appendix J

Non-Parametric Analyses of Desired Frequency of Rest Scores

Table a

$\underline{\chi}^2$ Analysis of Effects of Reward on Desired Frequency of Rest Scores (Numbers of Ss)

Reward	Below Median	Above Median	Total
8 Credits	11	16	27
4 Credits	17	11	28
Total	28	27	55
	$\underline{\chi}^2 = 3.07$, $\underline{P} < .10$		

Table b

$\underline{\chi}^2$ Analysis of Effects of Instructions on Desired Frequency of Rest Scores (Numbers of Ss)

Instructions	Below Median	Above Median	Total
Neutral	15	12	27
Negative	13	15	28
Total	28	27	55
	$\underline{\chi}^2 < 1.00$		

REFERENCES

REFERENCES

Aronson, A. The effect of effort on the attractiveness of rewarded and unrewarded stimuli. J. abnorm. soc. Psychol., 1961, 63, 375-380.

Brehm, J. W. Attitudinal consequences of commitment to unpleasant behavior. J. abnorm. soc. Psychol., 1960, 60, 379-383.

Brehm, J. W., and Cohen, A. R. Choice and chance relative deprivation as determinants of cognitive dissonance. J. abnorm. soc. Psychol., 1959, 58, 383-387.

Brehm, J. W., and Cohen, A. R. Explorations in cognitive dissonance. In press.

Carlson, E. R. Attitude change through modification of attitude structure. J. abnorm. soc. Psychol., 1956, 52, 256-261.

Cohen, A. R. An experiment on choice and attitude change. In J. W. Brehm and A. R. Cohen, Explorations in cognitive dissonance. In press.

DiVesta, F. J., and Merwin, J. C. The effects of need-oriented communications on attitude change. J. abnorm. soc. Psychol., 1960, 60, 80-85.

Festinger, L. A theory of cognitive dissonance. Evanston: Row, Peterson, 1957.

Katz, D. The functional approach to the study of attitudes. Pub. Opin. Quart., 1960, 24, 163-204.

Katz, D., and Stotland, E. A preliminary statement to a theory of attitude structure and attitude change. In S. Koch (Ed.), Psychology: A study of a Science. Volume 3. New York: McGraw-Hill, 1959. Pp. 423-475.

Kleiner, R. J. The effects of threat reduction upon interpersonal attractiveness. J. Pers., 1960, 28, 145-155.

Leventhal, G. S., and Brehm, J. W. An experiment on volition of choice. In J. W. Brehm and A. R. Cohen, Explorations in cognitive dissonance. In press.

Maccoby, E. E., Maccoby, N., Romney, A. K., and Adams, J. S. Social reinforcement in attitude change. *J. abnorm. soc. Psychol.*, 1961, 63, 109-115.

Peak, H. Attitude and motivation. In M. R. Jones (Ed.), *Nebraska symposium on motivation*. Lincoln: Univer. Nebraska Press, 1955. Pp. 149-189.

Peak, H. The effect of aroused motivation on attitudes. *J. abnorm. soc. Psychol.*, 1960, 61, 463-468.

Peak, H., and Morrison, W. H. The acceptance of information into attitude structure. *J. abnorm. soc. Psychol.*, 1958, 57, 127-135.

Rabbie, J. M., Brehm, J. W., and Cohen, A. R. Verbalization and reactions to cognitive dissonance. *J. Pers.*, 1959, 27, 407-417.

Rosenberg, M. J. Cognitive structure and attitudinal affect. *J. abnorm. soc. Psychol.*, 1956, 53, 367-372.

Rosenberg, M. J. A structural theory of attitude dynamics. *Pub. Opin. Quart.*, 1960, 24, 319-340. (a)

Rosenberg, M. J. An analysis of affective-cognitive consistency. In C. I. Hovland and M. J. Rosenberg (Eds.), *Attitude organization and change*. New Haven: Yale Univer. Press, 1960, Pp. 15-64. (b)

Woodruff, A. D., and DiVesta, F. J. The relationship between values, concepts and attitudes. *Educ. psychol. Measmt.*, 1948, 8, 645-659.

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(With Jack W. Brehm) An experiment on the effect of commitment. In J. W. Brehm and A. R. Cohen, *Explorations in cognitive dissonance.* In press.

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